BLANKOM®

Professional Headend Solutions

Operating instructions

4-way RF combiner amplifier

RFCA
Part N°: 5170.01

...Setting Signals

Contents

1. Safety and operating instructions

When assembling, starting-up and adjusting the modules, it is necessary to consider the system specific references in the manual instruction.

The modules may only be installed and started up by authorized technical personnel. There are only permitted the mounting styles indicated in the quick start guide, which is included each module.

When assembling the modules into the receiving points, the adherence of the EMC regulations is to be ensured.

The assembly and wiring have to be done without voltage. For installation, the supplied accessories (DIN rail clip with screws and 19“ accessories) may only be used.

All active modules may only be operated with the power supplies of the HELIOS family or QUASARIOS. Only connect the module with the accessory cables provided.

The mains voltage and the operating voltage of the modules working by DC have to be in complience to the operating parameters described in the technical data.

With all work the defaults of the DIN EN 50083 have to be considered. It is especially important to follow DIN EN 60728-11[1].

The unit should be mounted only vertically. The ventilation slots as well as the circulation perforation of the modules are not be obstructed in any way.

If installed in mounting cabinets an adequate heat circulation must be guaranteed. The mounting in closed cabinets without air sufficient flow is **not allowed**.

For **DIN rail mounting** is important to note that between the heat sink and a neighboring building, a distance of 2 cm is required. If the modules mounted on top of each, so they must be spaced 20 cm apart.

For **19“ mounting** all devices in the rack must be fitted with 19“ Edge Guide. Mounting the device using only the screw holes at the front panel is insecure and discouraged. Furthermore, the operation of a fully occupied rack is only allowed with an underlying 1-U fan box (at least 3 fans, 176 mm deep).

WEEE-Reg.-N°. DE 50389067

2. Device variants

RFCA	5170.01	4x RF → 1x RF

3. Software options

CKB 200	5100.50	activation SNMP v3

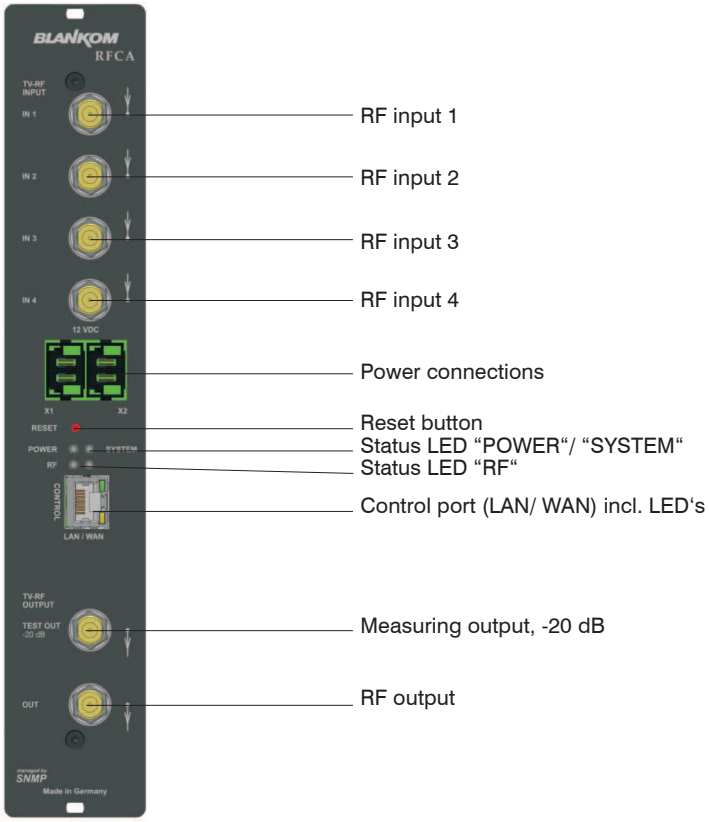
4. General

The Smart Business Line (SBL) is a modern head end system, that is distinguished by its modular and compact design. A user-friendly operating concept facilitates setup, configuration and maintenance of the system.
The RFCA has 4 for the SBL optimized RF inputs. These are combined via a network and applied to a variable gain amplifier.

5. Main features

- 4x RF input
- Adjustable gain in the range 0 ... 28 dB
- Output level monitoring
- - 20 dB measuring output
- HTML or SNMP control

6. Front view



managed by
SNMP

7. Functional description

The RFCA is specially designed for merging the RF outputs of signal blocks of the SBL head end system.
The input-side 4-way combiner is implemented with low-loss transformers that ensure the decoupling of the inputs.The electronic level control allows adjustment of the gain of the module via the integrated web interface. The level control is carried out in interstage technology and thus guarantees a low noise amplification. The output amplifier provides the required head end output level.The measurement output enables the reactionless check of the output signals.

8. Meaning of the status LED‘s

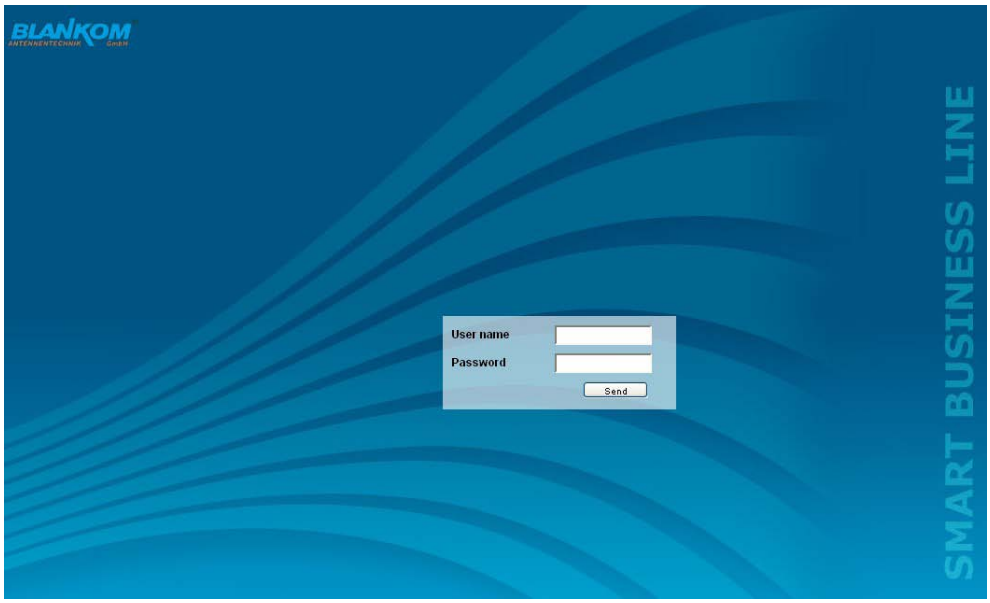
Designation	Colour	Status	Meaning of display
POWER	green	permanently on	module is on
	amber	permanently on	module is in standby
		off	module is off, operating voltage is not applied
SYSTEM	green	permanently on	module is ready for work
		flashing	software update is running
		off	module is not ready for work
RF	green	permanently on	deviation of the adjusted gain value < 1 dB
	amber	permanently on	deviation of the adjusted gain value is between 1 and 6 dB
		flashing	deviation of the adjusted gain value > 6 dB
		off	amplifier is off

9. Adjusting by web server

9.1 Network connection to the computer

System requirements:
- PC/ laptop with 10/100 Mbit Ethernet interface
- Internet browser (e.g. Windows Internet Explorer), which accept JAVA script.

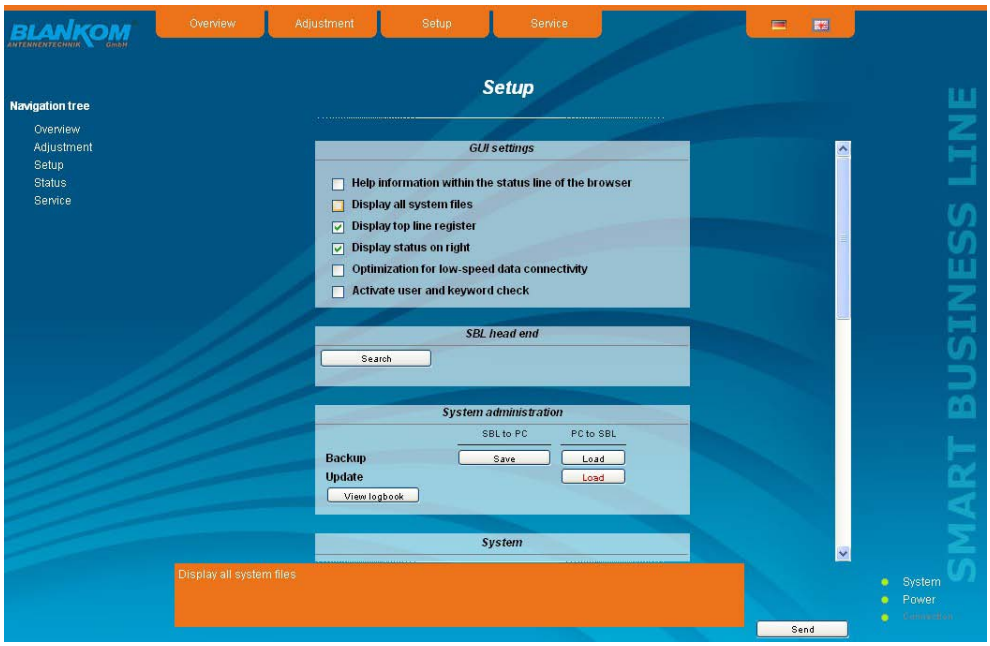
Setup the connection:
The module has to be connected to PC network using an Ethernet cable. The IP address of the module is 192.168.1.100 on delivery. If several SBL modules should be controlled or adjusted via an Ethernet switch, each module must first be configured **individually** to its provided IP address within the network. To do so address of the network port on the PC (temporary) must be adapted to the IP address of the SBL module (subnet mask: 255.255.255.0, IP address: 192.168.1.XXX, where XXX is **not** the same as the corresponding value of the SBL module IP address).
After the network configuration of the module(s) the IP address of the control PC is converted to the provided IP address and the modules can be accessed through the browser with their new IP addresses. The user must authenticate himself with his credentials (user name and password), if the password and user testing were activated on the setup page (see chapter 9.2.4):



After successful registration or successful connection establishment without password (default setting) the start page of the module is the menu “Overview“ (see chapter 9.2.1).

9.2 Setting of individual parameters

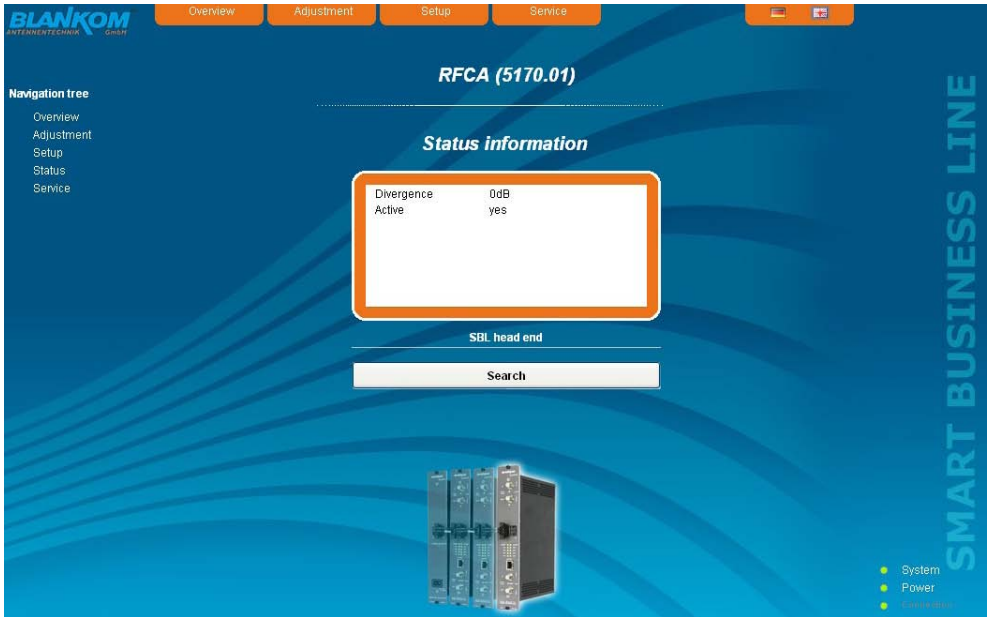
Using the web site, you can set certain parameters of the module or perform configurations on the module or the user interface. The various setting menus can be selected in the navigation tree on the left side. The setting is supported by an online help. Hovering the parameters by the mouse in the lower part of the site an orange colored text box appears with explanations for each parameter. By setting in the “Setup“ menu (see chapter 9.2.4) may be selected so that the help appears in the status bar of your browser. If appropriate setting changes in the browser options are necessary.



In addition, in the lower part of the navigation tree status information for the module is displayed. By changing the “Setup“ menu, the status information can also be moved to the right (see also chapter 9.2.4). This gives status information about the system parameters. An orange LED symbol indicates an error condition, while a green LED symbol displays error-free working condition.
The last displayed point indicates the connection status between the network interface and the module. Green means, that the connection is established. A transparent LED light indicates that there is no connection or the connection is failed. Settings with the selection box or input fields are taken over by pressing the “send“ button and stored permanently, and the RFCA module is set on these values after a restart too. Settings with the check box are usually performed immediately but not stored in memory, so they would be lost on a possible restart of the module. To save these settings the “send“ button must be pressed.
In all menus, the language selection is possible between German and English top right.

9.2.1 Menu ”Overview”

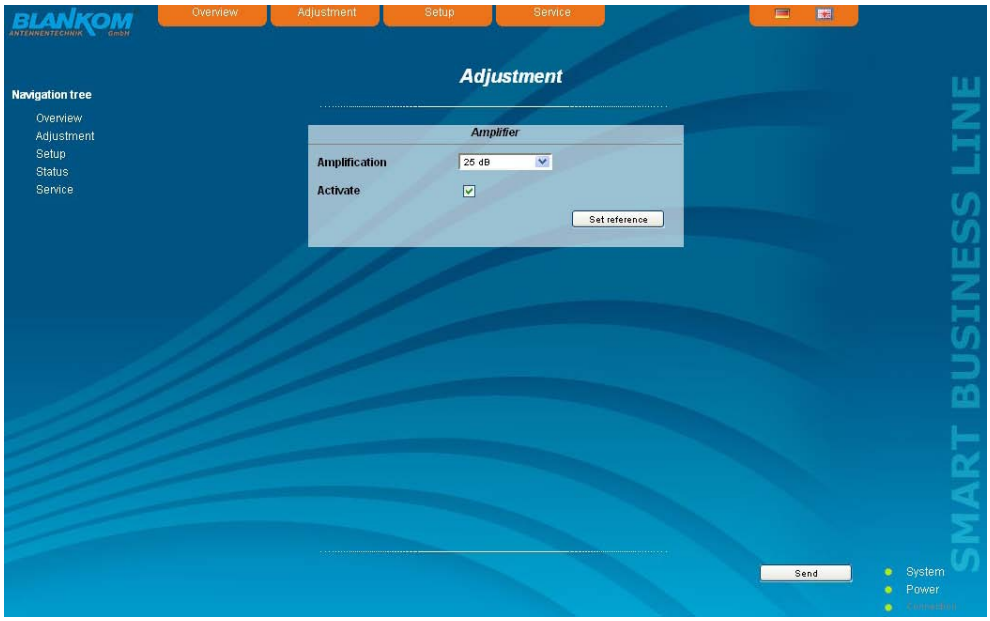
This page provides a status overview of the RFCA. Shown are the deviation of the adjusted output level, and whether the amplifier is active.



In addition, below the status window the head end display is visible. There all SBL modules are listed, which are in the same network and which have been associated with the head end in the “Setup“ menu (see 9.2.4). This is significant because functions over all modules such as the NIT processing between modules of the QAMOS product group can be extended to all components of the head end. The individual components of a head end are listed with their IP address, which is also provided with a link to this address, so you can switch easily to the next module. If no head end was configured, a “Search“ button appears, which forwards to the setup menu and scans the network for other SBL modules. Then all available modules are listed and can be selected and added to the head end.

9.2.2 Menu ”Adjustment”

In this menu item the adjustment of the amplifier is done. To do this, first selects the gain value in the range between 15 and 28 dB. By marking the box below the amplifier is activated. By pressing „Set reference“ the currently output level is set as the reference value. By pressing the „Send“ button, the values are set and stored.



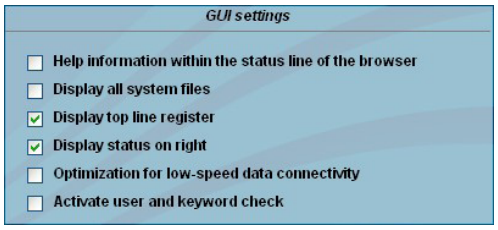
9.2.3 Menu ”Service”

In this menu you will find all information about the service for the module in particular the BLANKOM service hotline and the service email address. In addition, the implemented operating instructions may be downloaded or viewed as PDF. If there is an internet connection the BLANKOM homepage can be started, offering the latest software release or descriptions. Finally, the currently installed software release is displayed.

9.2.4 Menu ”Setup”

In this menu, various administrative and system settings are made.

Specifically, the following can be configured:



GUI settings

Help information within the status line of the browser
By default, the online help is displayed in an orange text box at the bottom of the page. By clicking this option, the help texts are displayed in the status bar of your browser. Depending on your browser sometimes such use has to be allowed in the browser settings.

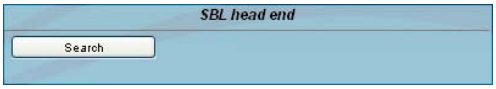
Display all system files
The default is, that the system files can be subjected to upload or download as a package under “Backup“ in the submenu “System administration“. By clicking this box, the system files are listed individually and can be individually subjected to an up- or download.

Display top line register
By default, the registers are shown in the upper part of the user interface, to move more quickly to the most frequently used menus. By removing the box marking the registers are hidden.

Display status on right
By clicking the box, the status of the channels or the system is shifted to the right of the user interface.

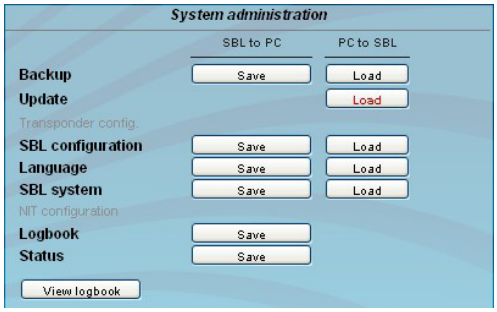
Optimization for low-speed data connectivity
By clicking the box the data volume of the browser pages is greatly reduced. So it is possible to adjust the module, if there is only a low-speed connectivity (GSM). The size of all pictures is then reduced.

Activate user and keyword check
This selection is only available if you are logged in as administrator. If the box is disabled, the log-in is skipped after each GUI reboot. Otherwise, user login and password are required (see chapter 9.1).



SBL head end

All SBL modules, which are located in the same network, are listet. By pressing the “Search“ button the list is updated. All marked modules belong to the head end and are displayed on the “Overview“ page.



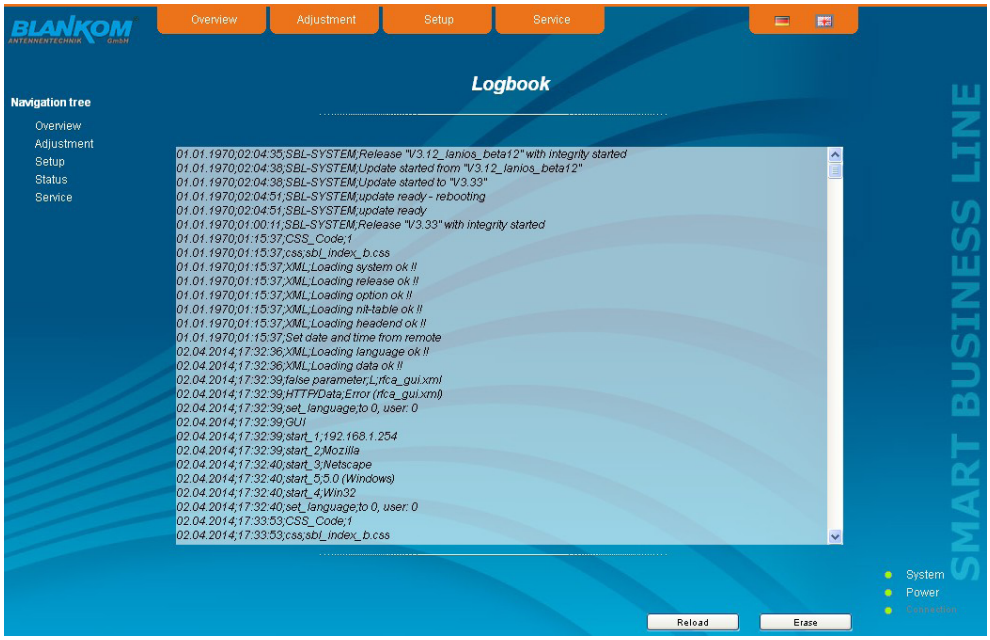
System administration

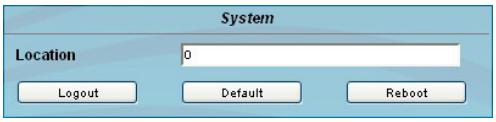
The default is displaying of the shortened list of files (top).

Backup
Here the system files can be loaded or saved as a package (except Logbook and Status). Thus, it is possible, for example to copy the system files from a RFCA-module to another. If under “GUI setup“ “Display all system files“ is selected, the system files can also be loaded or saved separately (see figure below). Furthermore, additional system files can be added.

Update
By clicking the “Load“ button, the internal software components can always be brought up to date.

Pressing the button “View logbook“ leads to an overview, in which all the processes have been documented since the start of the GUI. Each operation is listed by date, time and description. If operations have been executed, the logged on user, who initiated the action, is saved too. By pressing the “Erase“ button all entries are deleted, when you are logged in as administrator.





System

Location — In this field a name for the module is be made to identify the module easily. This name appears on the top right of the web site under the language selection box and is provided via SNMP with the question of the field: Iso(1).org(3).dod(6).internet(1).mgmt(2).mib.2(1).system(1).sysLocation(6).

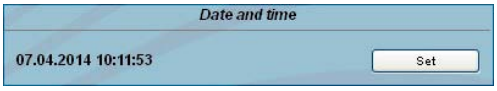
Logout — restart the user interface

Default — delete the settings and reset to default values (including IP address), available only if you have logged in as administrator

Reboot — restart of the RFCA module

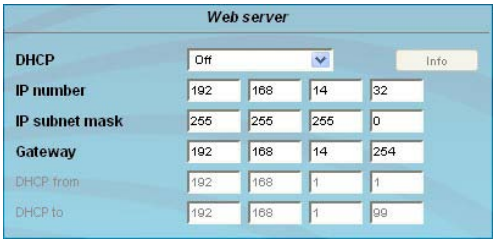
Enabling of

In this field, possible software options for the module can be enabled. The registration code must be entered in the input field and by pressing the “Send“ button the option will be activated. Activated options are displayed in black, inactive are grayed out.



Date and time

Clicking the “Set“ button, the date and time will be set to that of the PC.

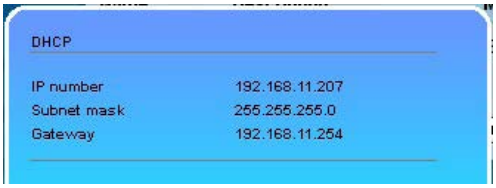


Web server

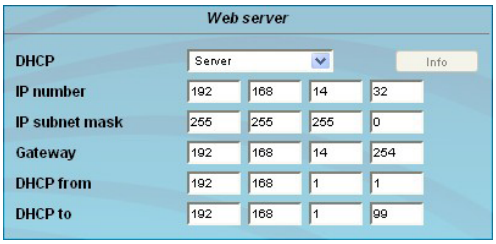
This setting appears only when you are logged in as administrator, and thus you have the authority to make administrative changes.
The RFCA supports the DHCP functionality. DHCP-Client is factory default. Note, that after each factory reset the RFCA is set to “Client“.

If the **DHCP functionality** is set to “Off“, in the appropriate fields the IP number, subnet mask and gateway can be manually entered and then the settings of the RFCA module are adapted to the network.

If the module is set to **“Client“**, it automatically obtains an IP address from the DHCP server on the network. The manual network settings are grayed out and are therefore disabled.



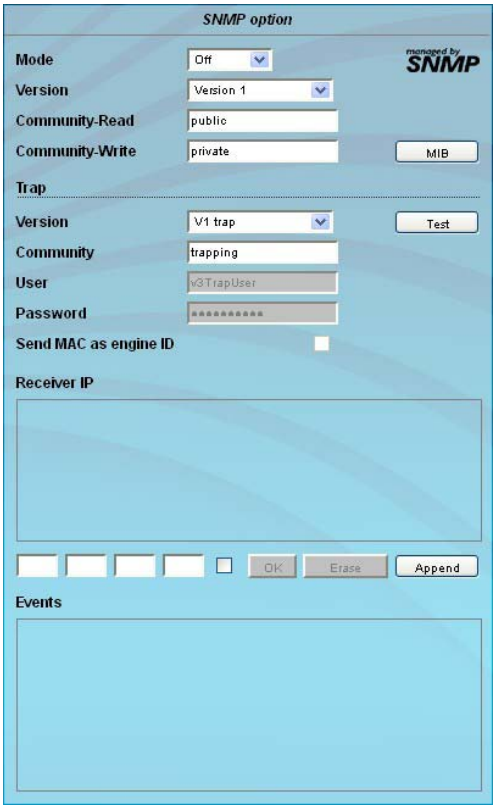
By pressing the “Info“ button the automatically assigned network configuration of the module is displayed.



Please note if the module is set to **“Server“**, that the IP address 192.168.1.100 should not be set. If you select this address, you will get an error message. In addition to the IP settings you can configure the DHCP range from which the IP addresses of the connected clients are assigned. The address range must match the address range according to IP address and subnet mask of the server and should not be too small. The default is the area 192.168.1.1 to 192.168.1.99. Additionally with the DHCP server will also set up a local DNS (Domain Name Server). To use it in full extent a connected PC/ laptop must be configured as a DHCP client. Please note, that the client unit not only get its IP address from the DHCP server, but also its DNS server.

If the module is configured as a DHCP server or client and the client has received an IP address successfully, so module can be accessed via a web browser using its name. This name is composed of the prefix “sbl“ and the device number that is printed on the back of the module and on the packaging. For example, the device with the number 0123456 can be called under “sbl0123456“. Should there be problems with it among the local network conditions, the domain can be added. In the case that the above module is configured as a server, the call using the domain is then “sbl0123456.sbl“. If another DHCP server is used, ask your administrator for the domain name.

An example of the simplification of the configuration or operation of the head end via DHCP, is, that a SBL module is as a server, the remaining modules and the connected PC/ laptop are configured as a client. By calling the browser “dhcp.sbl“ the GUI of the server module is loaded. If not already done so, now the head end can be read. So all connected components are found and listed. The head end can now be stored in the “Setup“ menu under the item “System administration“. The head end overview can be changed quickly to the user interface of any other module by selecting the respective modules links.



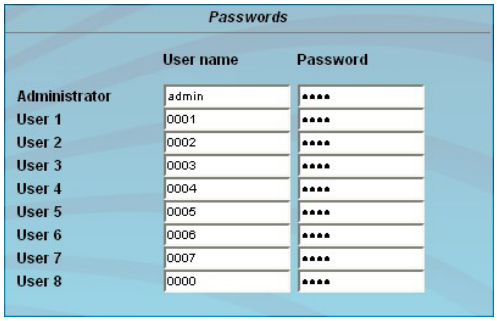
SNMP option

The SNMP adjustment is only available after the “SNMP“ option was enabled (see chapter “Enabling of“).
In the first section, the SNMP functionality, including the sending of traps is enabled or disabled with the “Mode“ selection field. With the selector “Version“ you can select the SNMP version (version 1, 2 or 3). In the two boxes below it, the communities for versions 1 and 2 are given separately for reading and writing via SNMP. With version 3, these two fields are disabled because all registered users of the module (see menu “Passwords“) have the automatic read access to SNMP. The write access can be enabled or disabled for each user by clicking the SNMP check box in the “Passwords“ menu.
By clicking the “MIB“ button the MIB of the module is generated and offered for download.

In the second section the trap settings are done. First, the trap version is selected:
V1 trap - normal traps according SNMPv1 with specified community
V2 trap - normal traps according SNMPv2 with specified community
V2 inform - sends information traps according SNMPv2 and waits for an acknowledgment
V3 trap - normal traps according SNMPv3
V3 inform - sends information traps according SNMPv3 and waits for an acknowledgment
The community can be configured for traps of SNMP versions v1 and v2. User/ password and the using of the network MAC address as the engine ID can be configured for traps of SNMP version v3. These settings must correspond with the configuration of the trap receiver, so traps are successfully transferred. For this purpose a test trap can be sent by clicking the button “Test“ to test the transmission of traps. If a test trap triggered, all pre-preserved traps are discarded.

There up to 256 IP addresses to receive the traps can be created or enabled. These are listed under “Receiver IP“. Below, the events can be configured, whether and partly with what thresholds they should trigger traps. There are three ways to configure a trap:
- without parameters, e.g. fan on/ off
- with a freely selectable parameter for a medium priority
- with a selectable parameter from a list for a medium priority

References and notes:
All users using SNMPv3 must use passwords with at least 8 characters. For SNMPv3 the SBL supports only the authentication password, not the privacy password. The SBL only supports the MD5 algorithm for authentication password in SNMPv3.
Information traps are specific traps that are possible up to SNMPv2. If there is no acknowledgment of the receiver, the transmitter attempts to transmit it later, until the confirmation is received.
A SBL module holds up to 256 information traps that could not be sent successfully. If there are more unconfirmed traps, the older traps are discarded and noted in the logbook as having failed. A successful sent trap is also registered as such in the logbook. In case of power failure or reboot of the module the non-confirmed traps are lost.
Details may be found in the help text for each event. The critical priorities are each covered with fixed values that can not be changed.
If the web site of RFCA module is open, no changes are possible via SNMP.



Passwords

Again, this setting appears only when you are logged in as administrator, having the authority to make administrative changes. In addition the box “Activate user and keyword check“ in the submenu “GUI settings“ has to be clicked. The user ID and password for the administrator can be set in the first line. The fixing of up to 8 user identification and passwords is possible. The limitations of user rights exist only in the fact that they are not authorized to change web server settings, user rights and password changes and default settings.
The **default password** for the **admin** is: 1111
and for the **users:** 0000
If the SNMP option is enabled, to the right of each user appears an SNMP check box. By clicking the box, the writing rights for individual users can be awarded for the SNMP version 3 (see also section SNMP option).

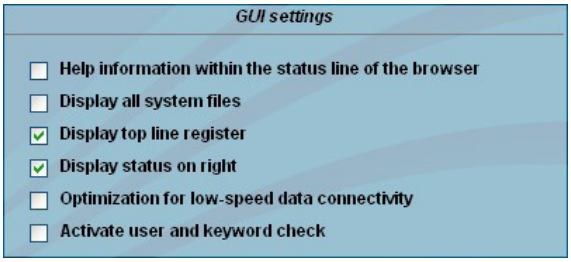
9.2.5 Menu ”Status”

It presents an overview of the status of the various components of the module, which is updated every 5 seconds.

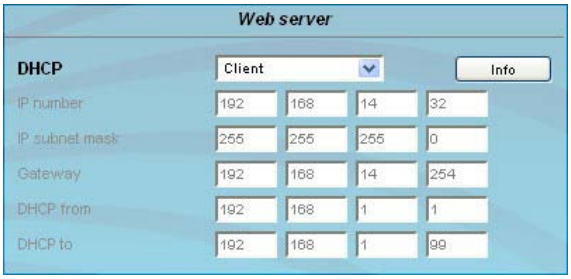
10. Factory settings

A short pressing of the reset button on the front of the module causes a reboot, i.e. it will restart the module and all stored values are adjusted. If the module is to be reset to factory settings, the reset button must be pressed so long to keep up until the “POWER“ and “SYSTEM“ LED will illuminate green permanently. This process takes about 15 seconds. In this case the module is set to the following:

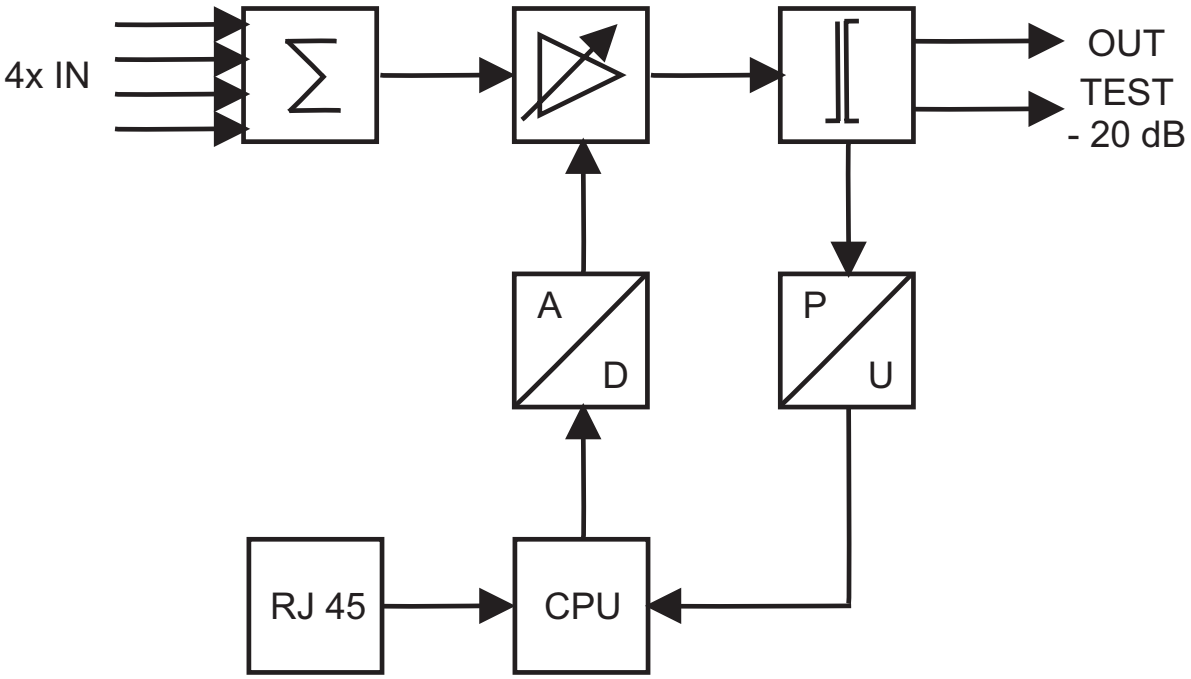
Setup settings



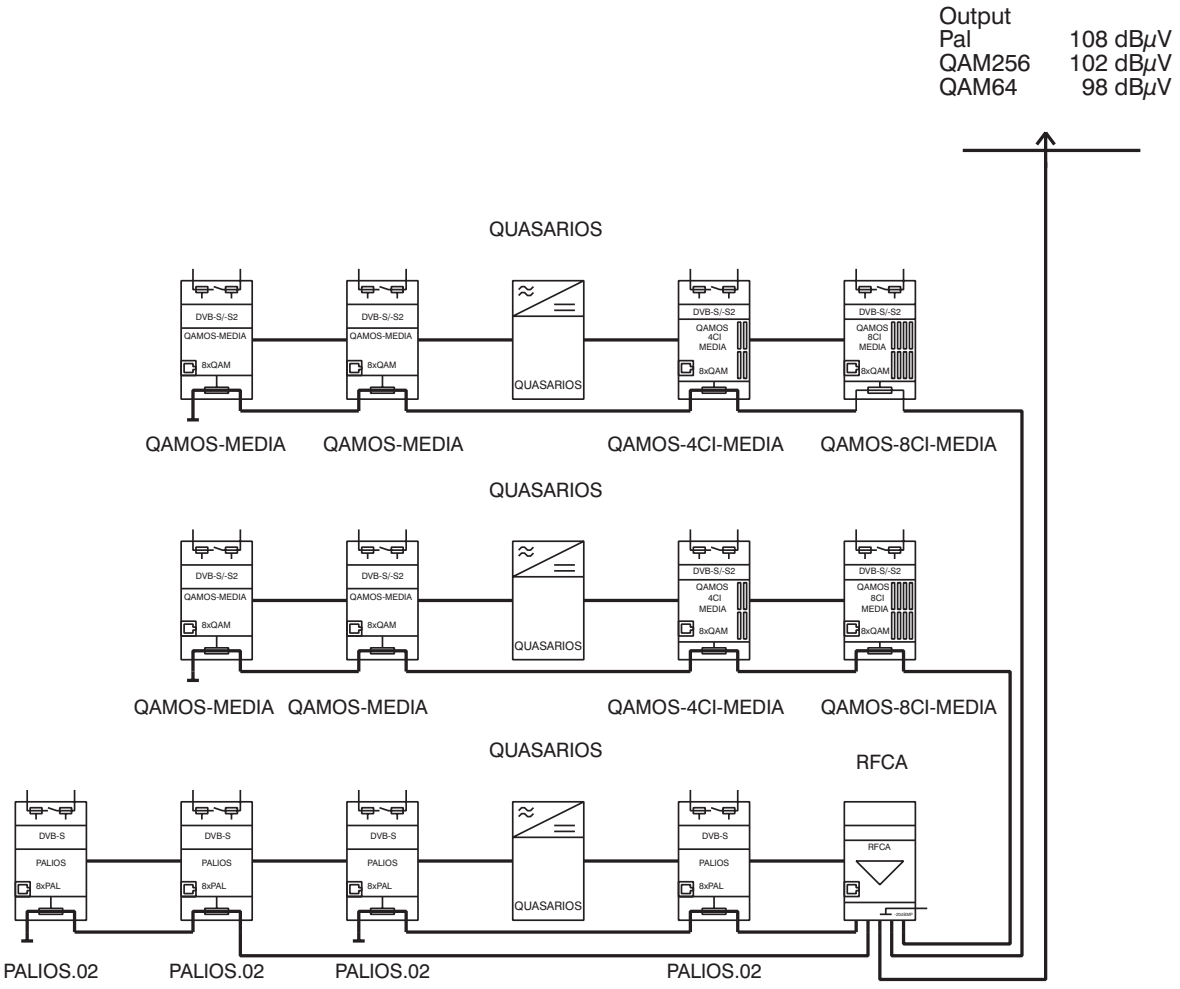
Network settings



11. Block diagram



12. Application example



13. Technical data

Forward path range		
Number of the inputs		4
Frequency range		45 ... 1006 MHz
Impedance		75 Ω
Connector		F socket (female)
Max. amplification		28 dB
Max. input level		112 dBµV
Operating input level		78 ... 98 dBµV
Frequency response		± 1 dB
Test output		- 20 dB
Max. output level		128 dBµV according EN 50083-5, Pos. 3.2 [3]
Operating output level		108 dBµV accord. CENELEC 42 channel, flat, CTB = -72 dB
Level adjusting range		0 ... 20 dB
Level step size		1 dB
Return loss	input	> 14 dB
	output	≥ 18 dB 45 MHz - 1.5 dB/ octave
Operating parameters		
Voltage/ current		12 V (± 0.2 V) / 1200 mA
Residual ripple of the supply voltage		10 mV_{pp}
Environmental conditions		
Temperature range		-10 ... +55 °C
Temperature range for data keeping		5 ... 45 °C
Relative humidity		≤ 80 % (non condensing)
Method of mounting		vertical
Location of mounting		splash-proof and drip-proof
Miscellaneous		
Dimensions (w x h x d)		46 x 262 x 167 mm
Weight		1,400 g
Delivery content		1x supply cable 1x network cable 1x F connecting cable 4x terminating impedance 1x DIN rail clip 1x mounting accessories

14. Glossary

DHCP	**D**ynamic **H**ost **C**onfiguration **P**rotocol
DIN	**D**eutsches **I**nstitut für **N**ormung (German Institute for Standardization)
DNS	**D**omain-**N**ame-**S**erver
EN	**E**uropäischen **N**orm (European Standard)
EMC	**E**lectro**m**agnetic **c**ompatibility
GSM	**G**lobal **S**ystem for **M**obile Communications
GUI	**G**raphical **U**ser **I**nterface (grafische Benutzeroberfläche)
HTML	**H**yper**t**ext **M**arkup **L**anguage
IP	**I**nternet **P**rotocol
LAN	**L**ocal **A**rea **N**etwork
LED	**L**ight **E**mitting **D**iode
MAC	**M**edia **A**ccess **C**ontrol
MIB	**M**anagement **I**nformation **B**ase
PC	**P**ersonal **C**omputer
RF	**R**adio **F**requency
RU	**R**ack **u**nit
SNMP	**S**ingle **N**etwork **M**anagement **P**rotocol
WAN	**W**ide **A**rea **N**etwork

15. Bibliography

[1] EN 60728-11: Cable networks for television signals, sound signals and interactive services Part 11: Safety (IEC 60728-11:2005); German version EN 60728-11:2005

[2] EN 50083-2 : Cable networks for television signals, sound signals and interactive services - Part 2: Electromagnetic compatibility for equipment; German version EN 50083-2:2012

[3] EN 50083-5 : Cabled networks for television signals, sound signals and interactive services - Part 5: Headend equipment; German version EN 50083-5:2001

16. Notes on the device software

Device Software of the RFCA

The source code is available upon request.
Please address requests to:

BLANKOM Antennentechnik GmbH
Hermann-Petersilge-Straße 1

07422 Bad Blankenburg
Germany

17. Document history

Version	Date	Modification	Author
1.00	02.04.2014	basic document	Häußer

Options available upon request. Subjects to changes due to technical progress.

CE Declaration of Conformity

Manufacturer: BLANKOM Antennentechnik GmbH
Hermann – Petersilge – Straße 1
07422 Bad Blankenburg
Germany

Product Name: 4-way RF combiner amplifier

Type Name: RFCA

Type N°: 5170.01

BLANKOM Antennentechnik GmbH confirms that the mentioned product meets the guideline(s) of the Council for the approximation of legislation of the member states.

Electromagnetic compatibility (2004/ 108/ EC)
The following standards are met: DIN EN 50083-2: 2007-04 (EN 50083-2:2006-06)

Low voltage guideline (2006/ 95/ EC)
The following standards are met: DIN EN 60950-1: 2006-04 (EN 60950-1:2006-11)
Information technology equipment -Safety-

Restriction of hazardous substances (2011/ 65/ EC)
The following standards are met: DIN EN 50581: 2013-02 (EN 50581:2012)

Bad Blankenburg, Germany, 2014-04-02

Dr. Piero Kirchner
(Managing Director)